CPS SCA Series Grid-Tied PV-Inverter

CPS SCA3/4/5KTL-O/US

Installation and Operation Manual

Version 1.0

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Before You Start…

This manual contains important information regarding installation and safe operation of this unit. Be sure to read this manual carefully before using.

Thank you for choosing this CPS Grid-tied PV Inverter. This PV Inverter is a high performance and highly reliable product specifically designed for the North American Solar market.

If you encounter any problems during installation or operation of this unit, first check the user manual before contacting your local dealer or supplier. This user manual is applicable for the following 3 models: CPS SCA3KTL-O/US, CPS SCA4KTL-O/US and CPS SCA5KTL-O/US.

Instructions inside this user manual will help you solve most installation and operation difficulties. Please keep this user manual on hand for quick reference.

Chapter 1 IMPORTANT SAFETY INSTRUCTIONS (SAVE THESE INSTRUCTIONS)

Please read this user manual carefully before undertaking the installation. CPS reserves the right to refuse warranty claims for equipment damage if the user fails to install the equipment per the instructions in this manual.

	DANGER: DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.
	WARNING: WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.
	CAUTION: CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
	NOTICE: NOTICE indicates a hazardous situation which, if not avoided, could result in equipment working abnormally or property loss.
	INSTRUCTION: INSTRUCTION indicates important supplementary information or provides skills or tips that can be used to help you solve a problem or save you time.

Warnings and symbols in this document

Markings on the product

	HIGH VOLTAGE: The product works with high voltages. All work on the product must only be performed as described in this document.
	HOT SURFACE: The equipment is designed to meet international safety standards, but surfaces can become hot during operation. Do not touch the heat sink or peripheral surfaces during or shortly after operation.
	EARTH GROUND: This symbol marks the location of grounding terminal, which must be securely connected to the earth through the PE (protective earthing) cable to ensure operational safety.

DANGER:

Please disconnect the inverter from AC grid and PV modules before opening the equipment. When the PV array is exposed to light, it supplies DC voltage to this equipment. Make sure hazardous high voltage and energy inside the equipment has been discharged.

Do not operate or maintain the inverter until at least 8 minutes after disconnecting all sources from DC and AC sides.

WARNING:

All the installation and wiring connections should be performed only by qualified technical personnel. Disconnect the inverter from PV modules and the Power Grid before maintaining and operating the equipment.

CAUTION:

Although designed to meet international safety standards, the PV-Inverter can become hot during operation. Do not touch the heat sink or peripheral surfaces during or shortly after operation.

CAUTION:

CPS SCA3/4/5KTL series inverter is approx **38kg (84lbs)**.

Please Check the mounting bracket again before the PV Inverter is hung on to the bracket. At least 2 people are required for this procedure due to the weight of the inverter.

NOTICE:

This inverter is designed to connect AC power only to the public grid. Do not connect the AC output of this equipment directly to any private AC power equipment.

INSTRUCTION:

Please check with your local electricity supply company before selecting the grid connection standard.

Putting the inverter into operation before the overall system complies with the national rules and safety regulation of the application is not permitted.

Chapter 2 Overview

2.1 Inverter for grid-tied PV systems

CPS SCA3/4/5KTL series inverter is suitable for use with most household grid-tied systems. The system is generally made up of PV-panels, a PV-inverter, an AC-Connection Unit (the connection Interface) and the Grid (Electric Utility) (see Figure 2-1). When a PV-panel is exposed to sufficient irradiation (sunlight) and connected to an inverter, it generates DC power. The PV-Inverter converts DC power to AC power supplied to the Electric Utility via the AC-Connection unit. The AC power generated is supplied first to local loads. Any excess power is supplied to your local Electric Utility.

The following figure shows the PV-Inverter in the grid-tied PV System:

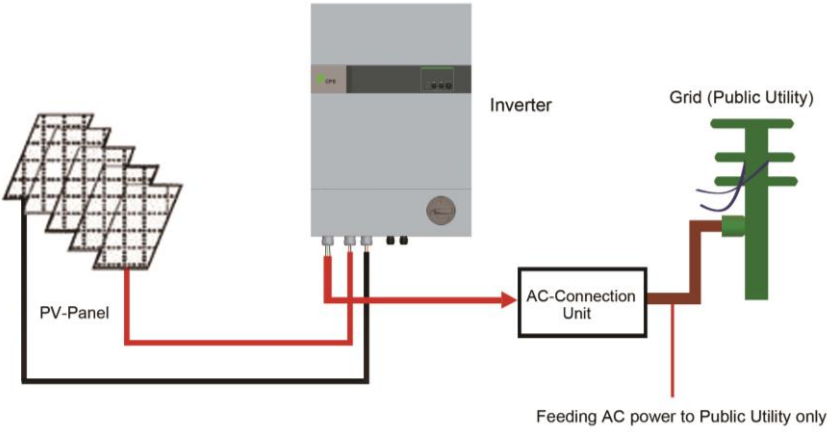


Figure 2-1 Grid-tied PV system

2.2 Product features

- Lead-free, RoHS compliant
- Up to 97.5% peak conversion efficiency
- Dual MPPT design
- NEMA 3R outdoor rated enclosure
- 2x16 LCD display
- Single phase, 208V L-L or 240V L-L
- Compact design
- High reliability with a standard 10 year warranty
- Easy operation
- Maintenance free operation
- Remote Communications Interface
- Complies with IEEE1547: 2003, IEEE1547.1: 2005 Standards
- Integrated GFDI on PV arrays
- Integrated series Arc Fault Detection.

2.3 Dimensions

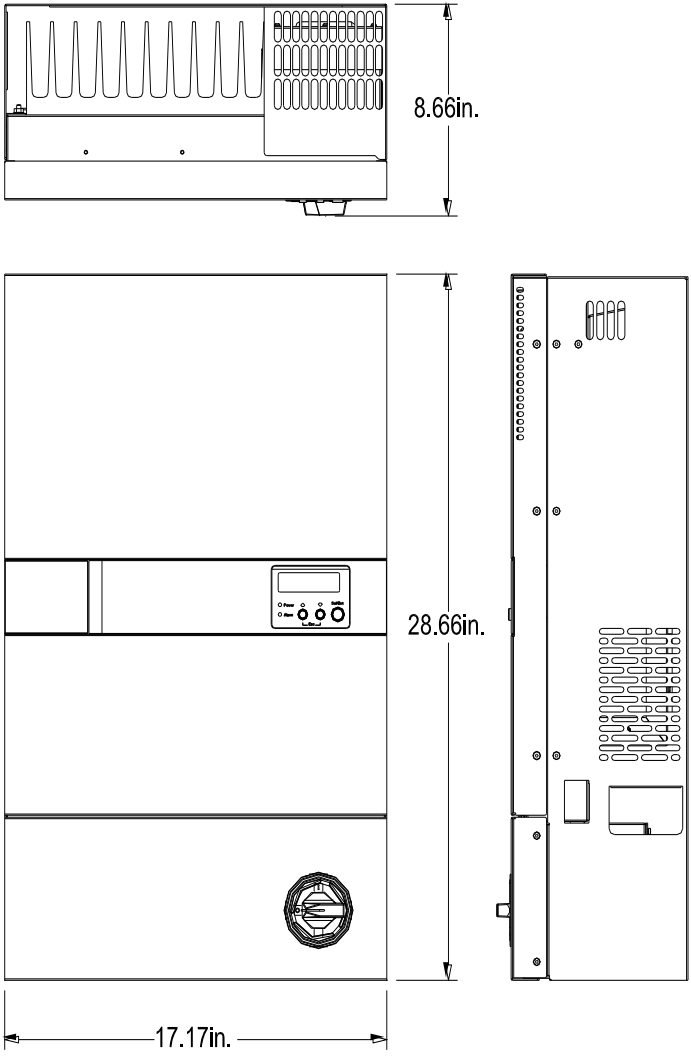


Figure 2-2 Dimensions of CPS SCA3/4/5K-O/US

2.4 Exterior Parts Description

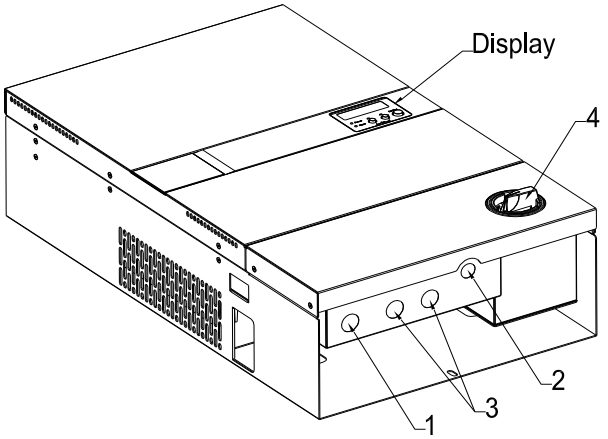


Figure 2-3 Exterior Parts Description

(1) AC-Output Cable Knockout: ¾" knockout for cable conduit for Grid connection L1 (Line 1), L2 (Line 2)/N (Neutral), GND (PE).

(2) Communication Interface Knockout: Use this location for inverter communications wiring.

(3) PV-Input Knockouts: Two ¾" knockouts for cable conduits for PV arrays connection. Refer to *Installation Section* for set-up information.

(4) AC/DC Disconnect Switch: This switch disconnects/connects both Grid and PV from/to Inverter.

- Horizontal switch position (0): Disconnect
- Vertical switch position (1): Connect

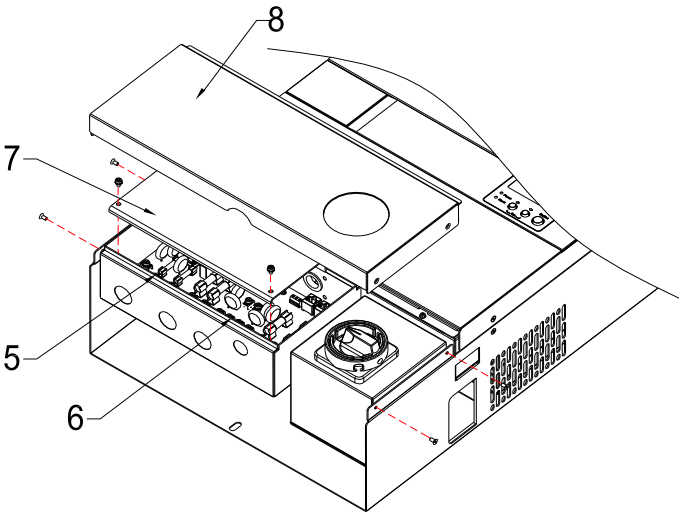


Figure 2-4 Remove the Wiring box terminal cover

(5) and (6) AC/DC Wiring Box and Terminals: AC and DC wiring termination.

(7) Wiring Box Cover: Transparent plastic cover to protect wiring termination area.

(8) Lower Panel: Weather sealed cover for the wiring box

Figure 2-5 LCD panel

(9) Sel/Ent Key: SELECT or ENTER key used to make display menu selections

(10) Down Key: Key used to move down the selection list in the display menu

(11) Up Key: Key used to move up the selection list in the display menu

(12) Alarm Indicator: Red light indicates an alarm that prevents the Inverter from exporting power to Grid.

(13) Power Indicator: Green light indicates the inverter is operating normally and exporting power to Grid.

(14) LCD: 16x2 character LCD display for detailed Inverter, PV, and Grid condition information.

Chapter 3 Installation

Please read the following installation instructions carefully and install the product step-by-step.

3.1 Inside the Package

The following items are included in the package:

Table 3-1 Main items

No.	Item	Qty	Note
(1)	Grid-tied PV inverter	1	
(2)	Mounting bracket	1	Inverter wall mounting bracket
(3)	Installation and Operation Manual	1	
(4)	Warranty service card	1	For maintenance and repair
(5)	Packing list	1	
(6)	Accessory kit	1	Contains all necessary installation accessories

The (6) Accessory kit contains items listed below:

Table 3-2 Accessories

No.	Item	Qty	Remarks
(1)	Mounting Screws	8	For mounting bracket

(2)	Snap Bushings/anchors	8	For mounting bracket
(3)	Safety-lock screws	1	To secure the inverter
(4)	Mounting plate of the data logger	1	For optional comm. card
(5)	Ring terminals	13	For wire connections
(6)	Cable gland	1	For communication ports
(7)	Seal pin	2	For cable gland holes

3.2 Basic requirements

- ✓ Check that the product environmental specifications (protection degree, operating temperature range, humidity and altitude) meet the requirements of the specific project location;
- ✓ Make sure that the power grid voltage is within normal range;
- ✓ Ensure that the local electricity supply authority has granted permission to connect to the grid;
- ✓ Installation personnel must be qualified electricians or people who have received professional training;
- ✓ Sufficient space is provided to allow the inverter cooling system to operate normally;
- ✓ Install the inverter away from flammable and explosive substances;
- ✓ Avoid installing the inverter in locations that exceed the temperature limits specified in the inverter data sheet to limit undesirable power loss;
- ✓ Do not install the inverter near an electromagnetic source which can compromise the normal operation of electronic equipment;

3.3 Mounting the PV-Inverter

INSTRUCTION:

The PV-Inverter can operate at locations where the ambient temperature is up to 60°C (140°F). However, for optimal power production, it is recommended that inverter is installed where the ambient temperature is between -25°C and +45°C (-13°F ~+113°F)

To mount the inverter to a wall or structure, please follow these steps:

1. Select a wall or solid vertical surface which is strong enough to support the inverter.
2. The PV-Inverter requires adequate cooling space for heat dissipation. Reserve at least 300mm (~12”) above and 500mm (~20”) (measured start from the bottom of the AC cover) below the inverter. Each inverter should have a minimum of 300mm (~12”) space to each other for multiple inverters installation.

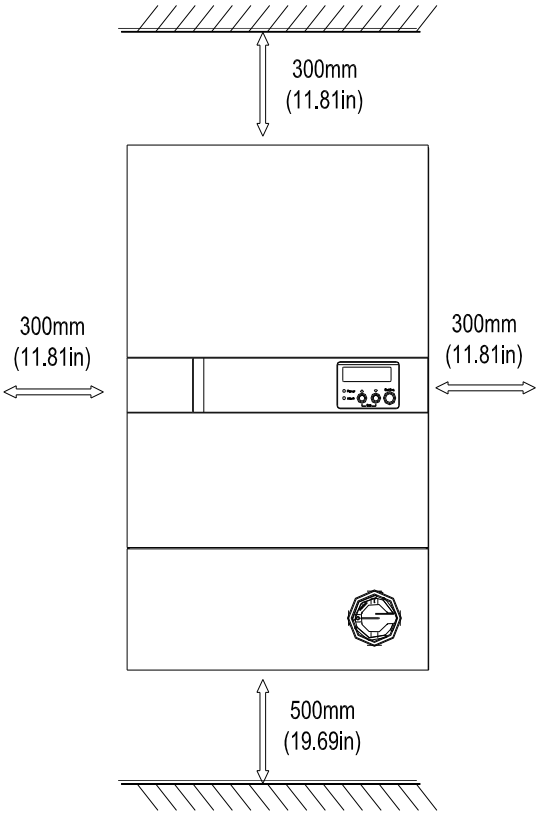


Figure 3-1 Inverter mounting dimensions

NOTICE:

Inverter utilizes natural convection cooling for its heat sink. Mounting the inverter in a horizontal position or having an obstruction on the top of Inverter will result in overheating.

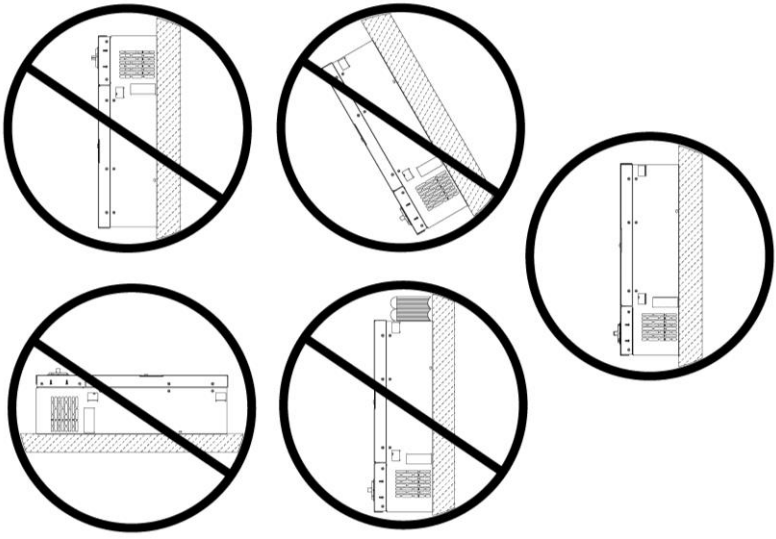


Figure 3-2 Mount the inverter correctly

3. Fix the Bracket to the wall or structure and mount:

Mark 7 holes to fit the mounting bracket as illustrated in Figure 3-3. Mounting bracket can be used as a template. Use leveler to make sure the mounting bracket is leveled.

Drill the 7 marked holes in the wall using 7/32” bit, and insert concrete anchors (included with Inverter) into the wall.

Mount bracket to the anchors using screws (included with Inverter).

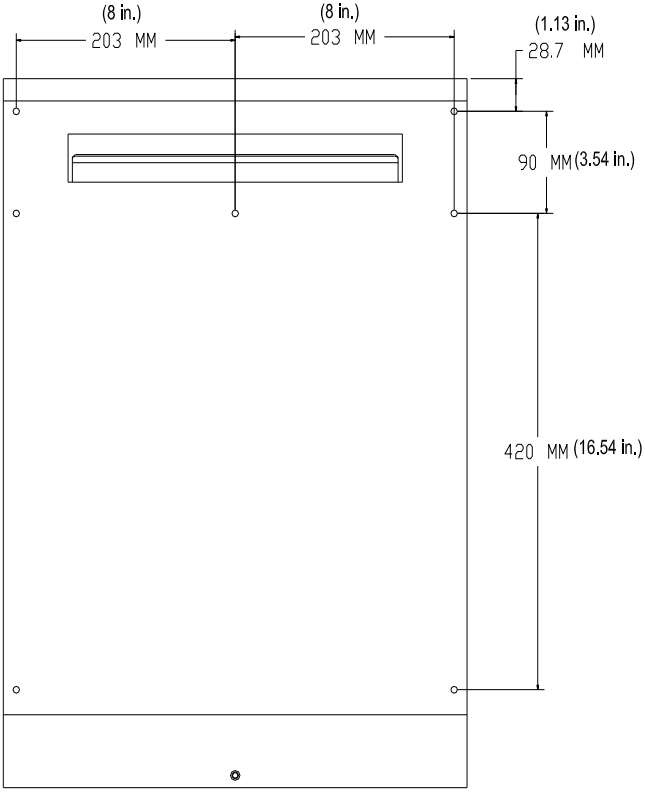


Figure 3-3 Dimensions of CPS SCA3/4/5KTL bracket holes

4. Mount the PV-Inverter onto the base plate as illustrated in Figure 3-4.

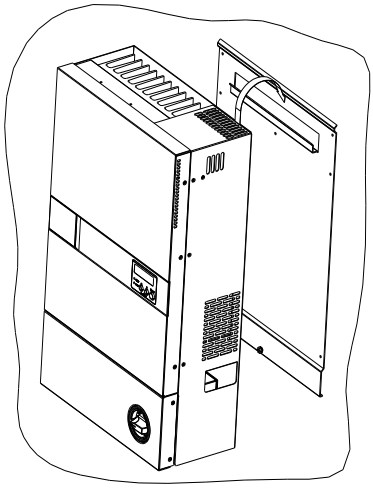


Figure 3-4 Mount the inverter on the bracket

5. Secure the inverter to the bracket with M6 screw to hold the bottom of inverter to keep the inverter from vibrating against the wall, as shown in Figure 3-5.

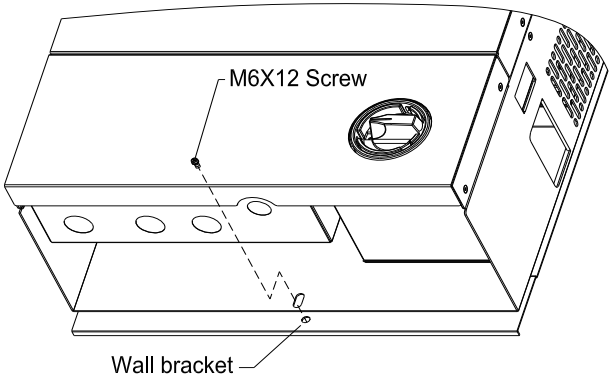


Figure 3-5 Mounting clamp

3.4 Electrical installation

3.4.1 DC Connection

Connections from PV panels to the Inverter are made in the Inverter Wiring Box. Cable type and size should be selected according to the following requirements:

- Use Class 2 or Class 3 cable, with temperature rating of 194 °F (or 90 °C).
- Wire size is from 12 AWG to 8 AWG.

1. Switch off circuit breaker in the main switch box to disconnect utility.

2. Cover PV panels to prevent from producing DC energy during installation.

3. Put AC/DC disconnect switch to “0” position (OFF).

4. Remove the cover on the lower part of the inverter to access the Wiring Box of Inverter.

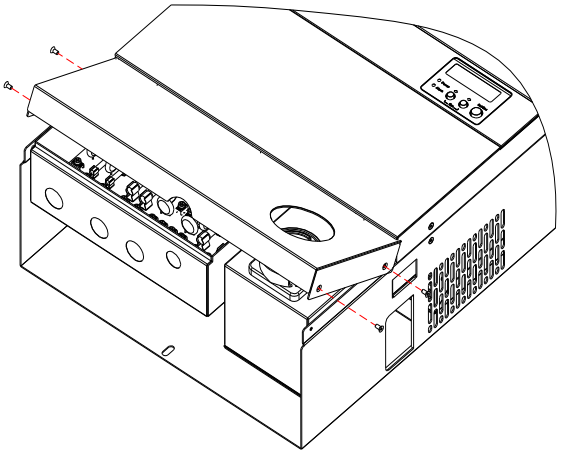


Figure 3-6 Remove Wiring Box Cover

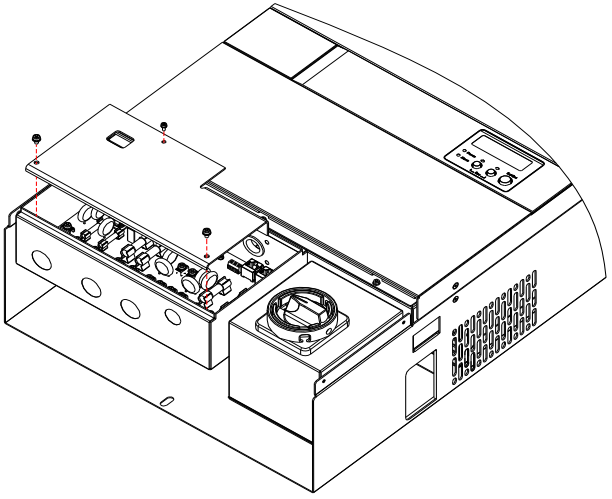


Figure 3-7 Remove Plastic Protective Cover

5. Configure single MPPT or dual MPPT

a. Single MPPT: This is not a typical configuration. Use a single MPPT if the array design requires it. For example, an array design with 3 input strings that would exceed the Maximum Input Current per MPPT channel may have improved power output if the 3 input strings are combined in a single MPPT. See Product Data Sheets for design guidelines and specifications.

i. Connect jumper bar between P48 and P49 on wiring board.

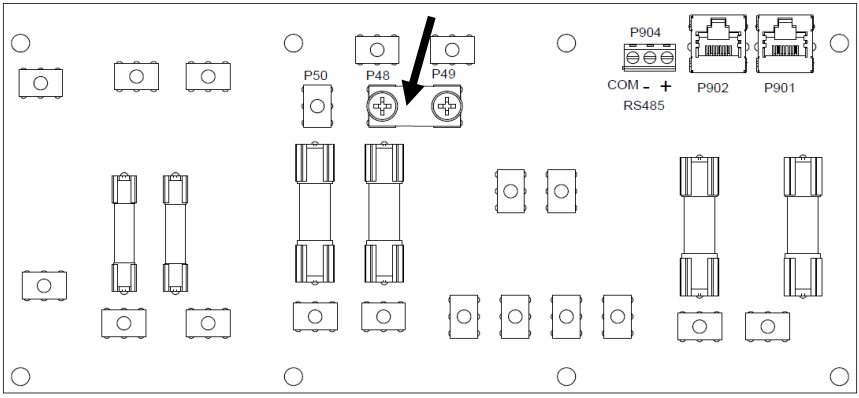


Figure 3-8 Single MPPT configuration

b. Dual MPPT:

i. This is the default configuration from factory and most common use of the product. Connect jumper bar between P48 and P50 on wiring board.

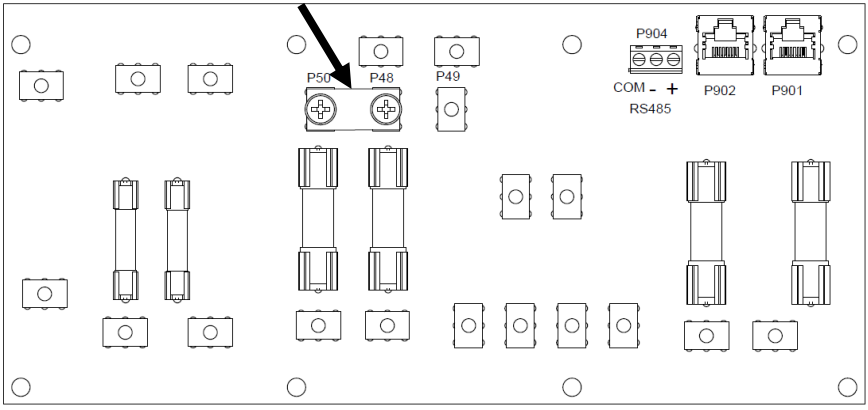


Figure 3-9 Dual MPPT configuration

6. Knock out the knockout openings at the bottom of the Wiring Box of Inverter.

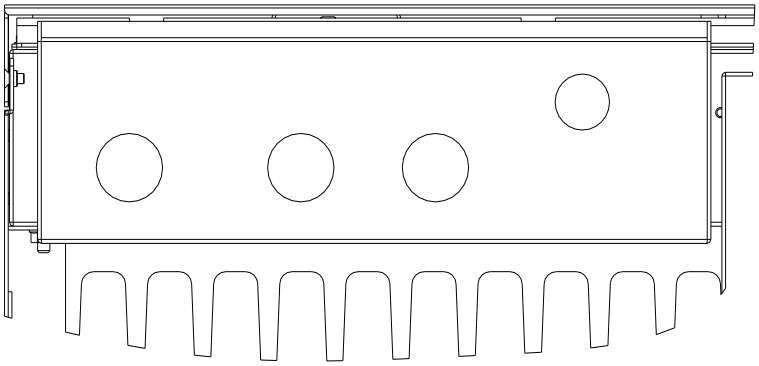


Figure 3-10 Knockouts for conduits

7. Install ¾ in. conduit fittings for outdoor use in the knockout openings on the bottom of the Wiring Box of Inverter. Use outdoor fittings to prevent water getting inside Inverter and conduit. All cables from PV string should be routed inside metal conduit.

8. Install ¾ in. metal conduit between the Inverter and PV strings or the combiner box.

9. Pull cables from the PV side through conduit. Use only Class 2 or Class 3 cables. Solid wire is not recommended for use with ring lugs and screw terminals in the Inverter. Put ring lugs at the end of cables before connecting them to terminal block on the inverter side.

10. From each PV string, connect the Positive DC cable to terminal label (+) and Negative DC cable to terminal labeled (-). There are provisions for 4 PV strings (two strings for each MPPT) to be connected to Inverter (refer to Figure 3-11).

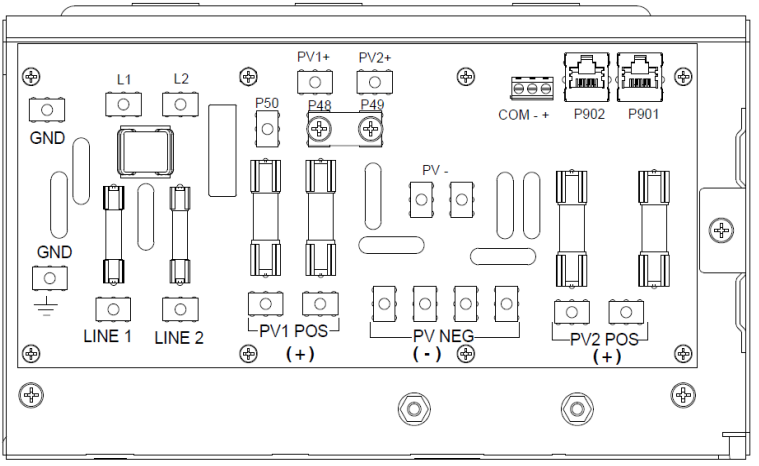


Figure 3-11 Internal layout of Wiring Box

11. Tighten terminal screws with 15 in-lbs (1.7N-m) of torque. Check that all terminals and cables are secured.

3.4.2 AC Connection

1. Switch off circuit breaker in the main switch box to disconnect utility.

2. Put AC/DC disconnect switch to OFF position.

3. Install a ¾ in. conduit fitting for outdoor use in the knockout opening below the Wiring Box of Inverter (refer to Figure 3-12).

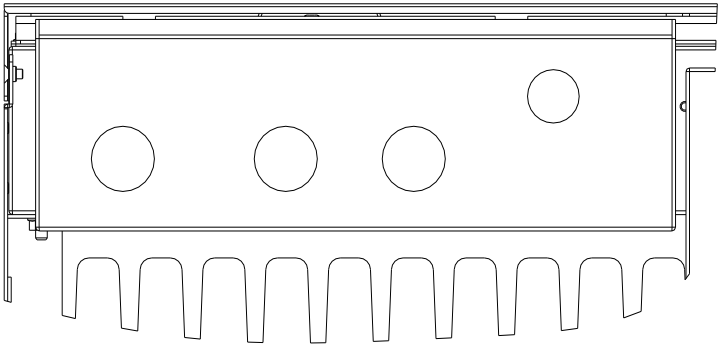


Figure 3-12 Knockout for conduits

4. Install ¾ in. cable conduit between Inverter and the main switch box.

5. Use only Class 2 or Class 3 cables. Solid wire is not recommended for use with screw terminals in the Inverter. Put ring lugs at the end of cables before connecting them to terminal block on the inverter side.

6. For 208V and 240V main:

   a. Connect L1 to terminal with label LINE 1
   b. Connect L2 to terminal with label LINE 2
   c. Connect Earth Ground to terminal with label GND

7. Tighten terminal screws with 15 in-lbs (1.7N-m) of torque. Check that all terminals and cables are secured.

3.4.3 Wiring Checklist

DANGER:

High voltages exist between terminals of PV panels when Panel is exposed to sufficient irradiation. Exposed terminals of the PV-Panel can cause electric shock. Avoid making physical contact with those parts of the device.

NOTICE:

Before connecting PV-Panels to DC terminals, make sure the polarity of each connection is correct. An incorrect connection could permanently damage the device.

NOTICE:

Perform an AC power quality measurement after the PV system is completed to check for any abnormal AC grid condition or harmonics.

NOTICE:

Any degradation or damage of the device due to nonperformance of the AC grid (non-compliance with IEEE standards) or uncontrolled power quality is out of the scope of warranty.

(1) Measure the utility power quality of each phase. Make sure the waveform of voltage is a pure sine wave without any harmonics right after your PV system is completed. Performing the measurement when your PV system is at maximum power generation is recommended.

(2) If harmonics exist in your PV system, one or more of capacitors or AC filters

may be required to install between the Inverter(s) and the utility isolation transformer until a pure sine wave is achieved. Any such action must be done by qualified personal and in conjunction with local electrical authorities. Specific guidance is outside the scope of this document.

3.4.4 Communication Interface

3.4.4.1 Standard RS-485 Communication

The inverter has integrated RS-485 communications capability. The RS-485 connections are made in the wiring box, as shown in Figure 3-13:

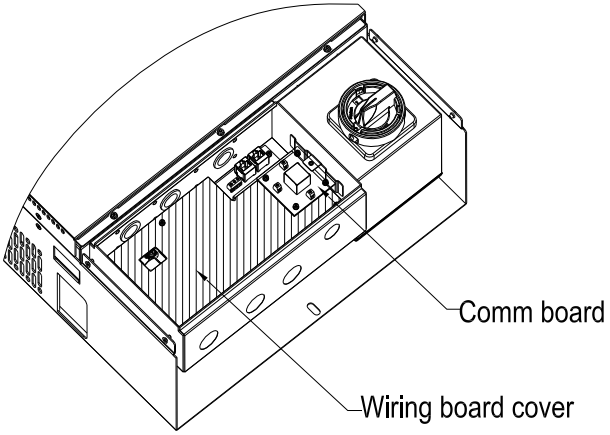


Figure 3-13 Internal communication structure

1. RS-485 +: communication pin (also called RS-485 A)
2. RS-485 -: communication pin (also called RS*485 B)
3. RS-485 COM: common ground for communication signal

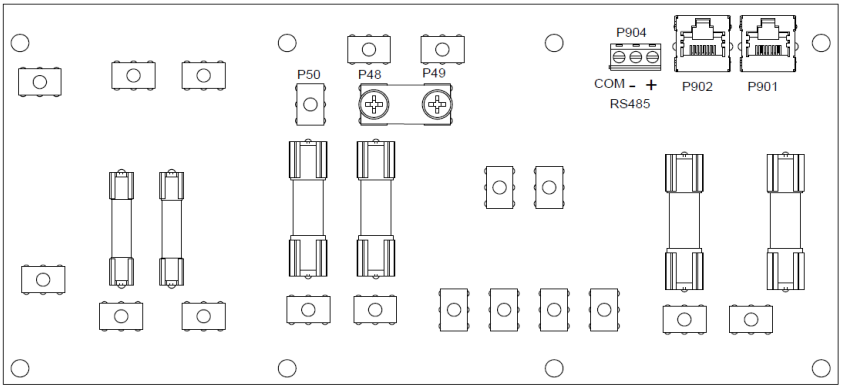


Figure 3-14 Communication connector on wiring board

3.4.4.2 Optional Ethernet Communication

Optional Ethernet Communication board can be installed in the field if such option is purchased by the customer. The optional board assembly can be installed as shown in Figure 3-15.

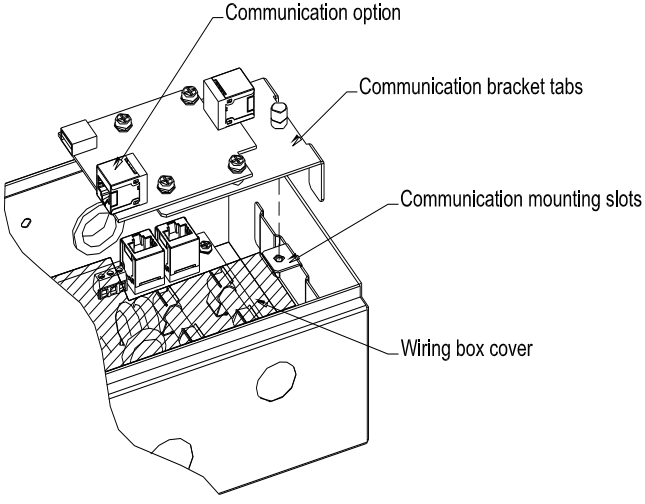


Figure 3-15 Mounting of communication option board assembly

Chapter 4 Commissioning

4.1 Start Up

The inverter will start up when the following conditions are satisfied:

1. Grid voltage and frequency are within nominal setting.
    - 240V settings: Grid voltage at start-up must be between 216V and 254V
    - 208V settings: Grid voltage at start-up must be between 187V and 220V
    - Grid Frequency must be between 59.5Hz to 60.3Hz
2. PV array voltage is greater than 200V on any one of two MPPT channels.

4.2 First-Time Start Up

During first-time start up, the inverter will prompt installers to choose various setting options to match grid conditions and to configure inverter's communication options.

INSTRUCTION:

After first-time start up, the inverter will not go through these configuration steps in subsequence start-ups. Inverter will go directly through start up sequence.

The installer can go back to the configuration screens by pressing **all three keys (Up, Down, and Enter) at the same time for 5 seconds**. After holding these keys for 5 seconds, the inverter will stop exporting power to the grid and allow the installer to choose the setup options as if it were the first-time start up.

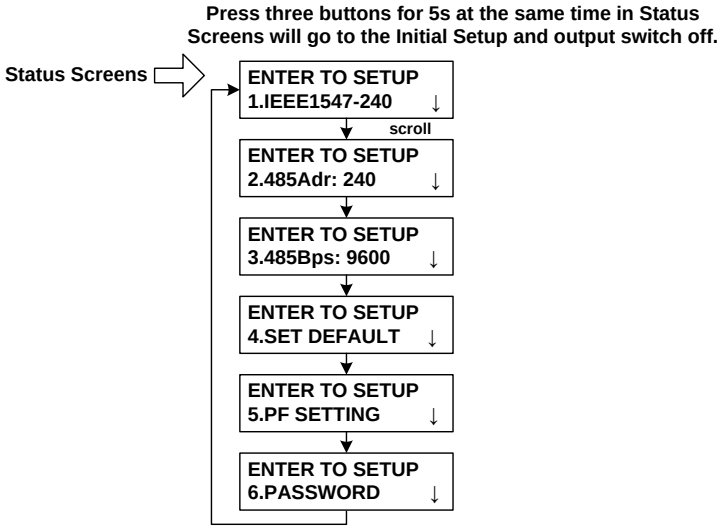

Press three buttons for 5s at the same time in Status Screens will go to the Initial Setup and output switch off.
Status Screens
ENTER TO SETUP 1.IEEE1547-240
scroll
ENTER TO SETUP 2.485Adr: 240
ENTER TO SETUP 3.485Bps: 9600
ENTER TO SETUP 4.SET DEFAULT
ENTER TO SETUP 5.PF SETTING
ENTER TO SETUP 6.PASSWORD

Figure 4-1 First-time start up sequence

1. Choose Nominal Grid voltage

   There are three nominal Grid voltage settings that installers can choose from. Scroll through the options using Up (and Down) buttons, and be selected with ENTER button.

   a. IEEE 1547-208: 208V Line to Line, 60Hz
   b. IEEE 1547-240: 240V Line to Line, 60Hz

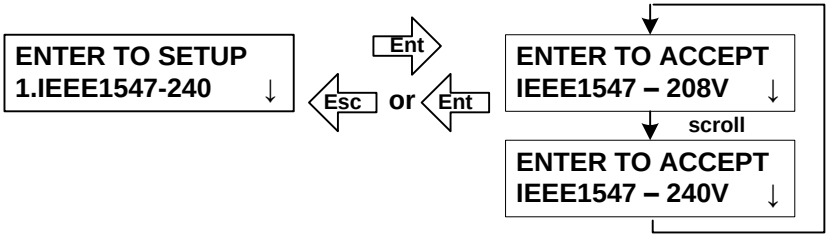


Figure 4-2 Choose nominal grid voltage

2. Choose Inverter RS485 address

This is the unique Modbus address of the inverter within a network of inverters and communication devices. The address can be any number between 0 and 99.

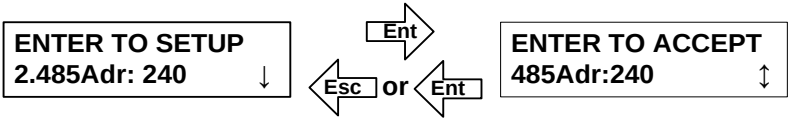


Figure 4-3 Choose Inverter RS485 address

INSTRUCTION:

No two Inverters in the same network can share the same address.

3. Choose Inverter Baud rate

Choose the communication Baud rate to match the rate of the device (gateway) that connects to inverter. The default Baud rate is 9600.

1. Press Up and Down key to change number for each digit.
2. Press Enter key to accept the value for each digit. The display will automatically jump to the next digit for entry.
3. After the last digit, Enter key will move to the next setting item.

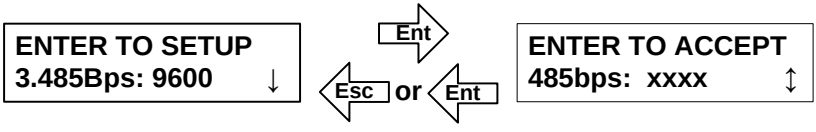


Figure 4-4 Choose Inverter baud rate

4. Set Default

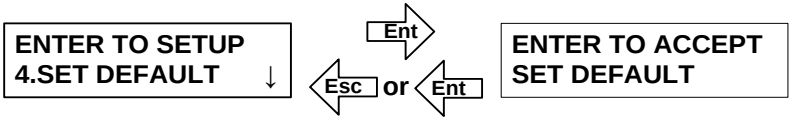


Figure 4-5 Clear or default setting

5. Power Factor Setting

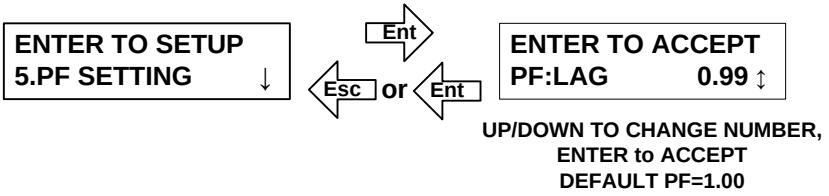


Figure 4-6 Adjust PF value

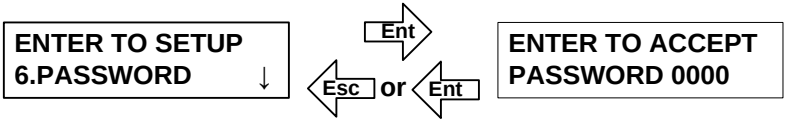
PF 1.00: Current is in phase with voltage. This is default setting.

Leading PF: Current is leading voltage in phase. This is also called over-excited condition or “capacitive”.

Lagging PF: Current is lagging voltage in phase. This is also called under-excited condition or “inductive”.

Press the Up and Down key to change value of Power Factor. Press the Enter key to accept Power Factor setting.

6. Set LCD Interface Password



Default Password is 5678

Figure 4-7 Set password

7. Exit Configuration

When all selections have been properly selected, the installer can go to START INVERTER to enable the inverter to start.

1. Press Enter key to go into the item
2. Press Enter key to exit the Setup Menu, and proceed to start up Inverter

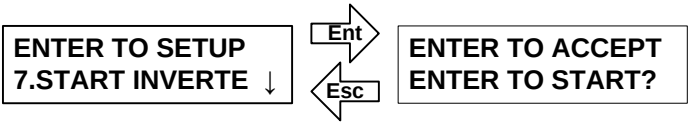


Figure 4-8 Complete configuration and start up Inverter

Display will show the Self Test screen during the Start-up Sequence. Press ESC combination will send the display to Information Screens.

4.3 Start-Up Sequence

The inverter will go through a sequence of safety checks before it starts exporting power. It takes the inverter about 5 minutes to go through the whole Start-Up Sequence.

Figure 4-9 Inverter self-test

The following are Self-Check items that the inverter goes through:

1. Check Ground Fault operation of internal circuit and check fault current on PV array. Ground fault current is also monitored continuously during operation. A Ground fault will stop the inverter from exporting power to the grid.
2. Check Impedance from the Positive and Negative terminals of the PV array to Earth Ground.

3. Check various internal components.
4. Check the disconnecting relays between Inverter and Grid.

If any of these tests fails, the inverter will display a fault message about the failure and will not connect to grid. If all Self-Test items pass, the inverter will connect and export power to Grid.

Chapter 5 User Interface

5.1 Normal Operation and Display Menu

5.1.1 Status Screens

After the inverter begins exporting power to the grid, the LCD display automatically scrolls through various information screens, displaying grid and PV array information. The Up and Down keys can be used to go to specific information. After 2 minutes, the display will resume scrolling.

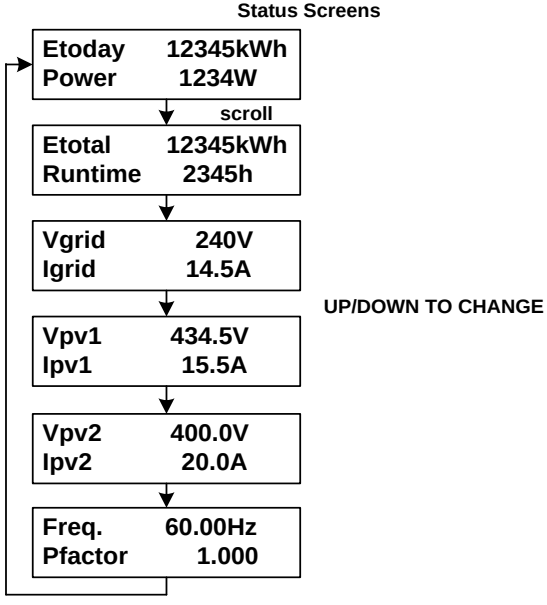


Figure 5-1 Inverter status screens

NOTE: LCD display will switch off after 2 minutes. Pressing any key will bring the screen back.

Inverter information includes:

Display info.	Explanation
Etotal	Cummulative energy produced over the entire operating life of the inverter. This number cannot be reset.
Runtime	Total run time. This number cannot be reset.
Etoday	Current day energy production. This number is reset to 0 every time the inverter power is recycled.
Power	Power currently produced.
Vgrid	Grid Voltage in true RMS value
Igrid	Active current produced in true RMS value
Vpv1	DC Voltage of PV array connecting to MPPT channel 1
Ipv1	Average DC Current of PV array connecting to MPPT channel 1
Vpv2	DC Voltage of PV array connecting to MPPT channel 2
Ipv2	Average DC Current of PV array connecting to MPPT channel 2
Freq	Grid Frequency
PF Setting	Inverter Power Factor setting

If there is an alarm, the LCD will display the alarm information. The user can use the Up and Down buttons to scroll through the alarm list. See more information about alarms in section 5.1.6. The user can exit the alarm screen by pressing the ESC combination keys (Up and Down button keys together).

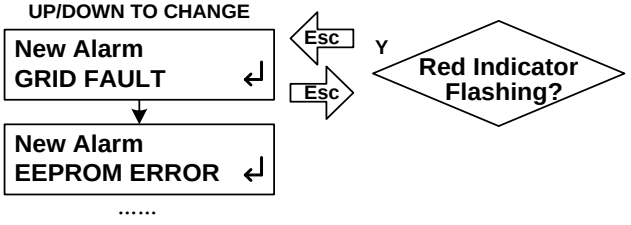


Figure 5-2 Inverter alarm screen

5.1.2 LED Lights

There are two LED lights, Green and Red, which indicate the general status of the inverter.

Green LED	Solid ON	Inverter is operating correctly and exporting power.
	Flashing ON/OFF	Inverter has a minor alarm that does not prevent the inverter from exporting power. These alarms could be (see Section 8 about display messages): o PV voltage is low o Problem with EEPROM
Red LED	Solid ON	There is a fault that prevents the inverter from exporting power. These alarms could be (see Section 8 about display messages): o Detection of Ground Fault current o Detection of series Arc Fault o Low resistance from PV terminals to Earth Ground o Grid voltage or frequency out of range o Loss of PV array sources. o Overheating

5.1.3 Inverter Information and Settings

The user can view information about the inverter and change the LCD display settings. Enter the Inverter Information and Settings level by pressing Enter key while in the Status Screen. Once in the Information and Setting screen, select the desired settings by using the Up, Down, and Enter keys.

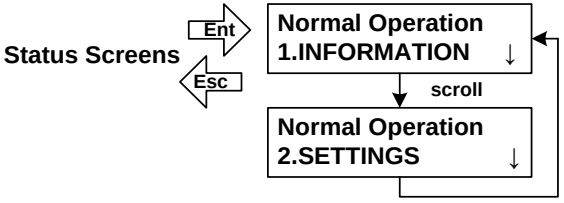


Figure 5-3 Information and settings

5.1.4 Inverter Information

In this screen menu, User can review the settings of Inverter. Information includes:

1. Inverter model rating
2. Inverter hardware revision
3. Inverter firmware revision
4. Inverter serial number
5. Inverter Grid voltage and frequency configuration
6. Inverter communication address
7. Inverter communication Baud rate

INSTRUCTION:

Setting levels cannot be changed in this menu level. User can make change by going to First-Time Start-Up Setting (see Section 4.2) by pressing all three keys for 5 seconds.

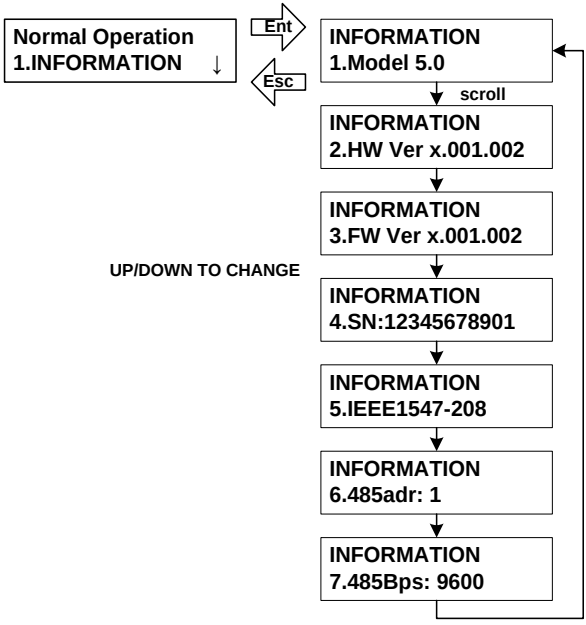


Figure 5-4 Inverter information

5.1.5 Inverter Settings

In this Menu, the user can make changes to the display contrast of the LCD screen and display language.

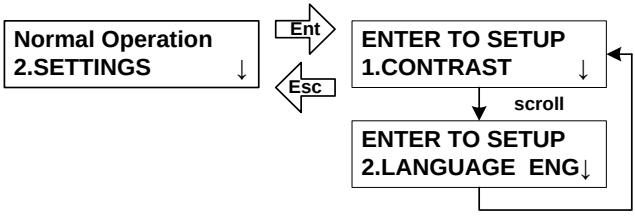


Figure 5-5 Inverter settings

Contrast:

There are 5 levels of contrast that user can select to make LCD characters easier to view in different light and temperature conditions.

1. Use Enter key to go into the contrast change screen.
2. Use Up and Down button to make change to contrast of LCD screen.
3. Use Enter key to accept the change.
4. Use ESC key combination to go back.

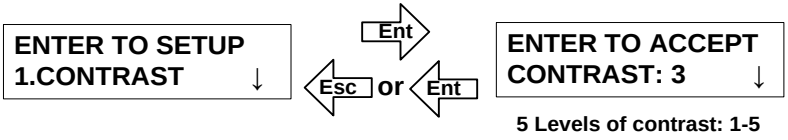


Figure 5-6 Contrast settings

Language:

There are two languages, English and German, from which user can select as the display menu language.

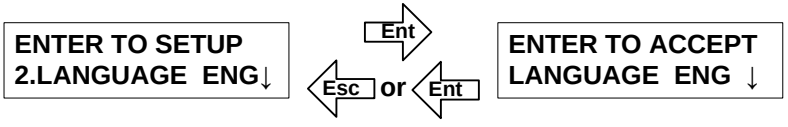


Figure 5-7 Language settings

5.1.6 Display Messages

Monitoring Parameters	Explanation
Etotal: xxxxx kWhr	Accumulated energy exporting to Grid over the lifetime of Inverter in kW-Hr
Runtime: xxxxxx Hr	Accumulated runtime of Inverter. (5 digit numbers)
Etoday: xxxxx WHr	Accumulated energy exporting to Grid in that day
Power: xxxx W	Instantaneous power exporting to grid
GridV: xxx.x V	Grid RMS voltage in Volt
GridI: xx.xx A	Grid RMS current in Amp
PV1V	Voltage of PV array number 1
PV1 I	Current of PV array number 1
PV2 V	Voltage of PV array number 2
PV2 I	Current of PV array number 2
Freq: xx.xx Hz	Grid frequency in Hertz
PF setting	Setting of Power Factor for exporting current
System Fault	**Explanation**
PV IMPEDANCE LOW	Resistance from either PV inputs to Earth Ground is lower than 600 kOhm
ISOLATION FAULT	Disconnecting relays between Inverter and Grid do not work properly
PV GND FAULT	Fault current from PV arrays to Earth Ground
ARC FAULT	Electrical series arcing in PV (DC) wiring
INTERNAL FAULT	Failure of self-test on internal converters in Inverter

GRID FAULT	Utility voltage and frequency are outside of operating range
PV VOLTAGE HIGH	PV array voltage is higher than PV operating range.
PV VOLTAGE LOW	PV array voltage is lower than PV operating range.
OVER TEMP	The internal temperature is higher than normal value.
EEPROM FAULT	EEPROM cannot be written.

Chapter 6 Preventative Maintenance

6.1 Troubleshooting

The PV-Inverter requires very little maintenance. When unexpected situation occurs, please refer to the following table for quick troubleshooting before contacting your local service. The following table lists common fault messages and ways to cope with the fault or error.

System Fault	Explanation	Action / Fault Clearance
PV IMPEDANCE LOW	Resistance from either PV inputs to Earth Ground is lower than 600 kOhm	Impedance from PV arrays to Earth Ground is low. PV arrays may need cleaning or drying. Inverter will continually test impedance again during Start-up Sequence in case low impedance caused by moisture on PV panel, and moisture will dry up later in the day. Check any short from PV terminals to Earth Ground.
ISOLATION FAULT	Disconnecting relays between Inverter and Grid do not work properly	Need to recycle power to Inverter. Inverter will retest relays during Start-up sequence. If Fault Message occurs again, contact your local service.
PV GND FAULT	Fault current from PV arrays to Earth Ground	Check impedance from PV arrays to Earth Ground. PV arrays may need cleaning or drying. Need to recycle power to Inverter to restart.

ARC FAULT	Sustained arcing in PV wiring is detected	Check DC wiring for signs of arcing or melting, especially at connectors or terminals. Replace damaged wires, damaged connectors, or tighten terminals. Need to recycle power to Inverter to restart.
INTERNAL FAULT	Failure of self-test on internal converters in Inverter	Need to recycle power to Inverter. Inverter will retest relays during Start-up sequence. If Fault Message occurs again, contact your local service.
GRID FAULT	Utility is not available	Check circuit breaker of circuit connecting to Inverter. Check configuration to see if it matches Grid nominal voltage. Inverter will automatically reconnect to Grid when Grid voltage and frequency is within operating range. Refer to Specification section of manual.
PV VOLTAGE HIGH	PV array voltage is higher than PV operating range.	Check voltage of PV arrays. Inverter will automatically reconnect to Grid when PV voltage is within operating range. Refer to Specification section of manual.
PV VOLTAGE LOW	PV array voltage is lower than PV operating range.	Check voltage of PV arrays. Inverter will automatically reconnect to Grid when PV voltage is within operating range. Refer to Specification section of manual.

OVER TEMP	The internal temperature is higher than normal value	Inverter could be overheated from exposure to abnormally high ambient temperature or in combination with direct exposure to the sun. Inverter will automatically reconnect to Grid when internal temperature drops to operating range.
EEPROM FAULT	EEPROM cannot be written	Contact your local service.

6.2 General maintenance

Although the PV-Inverter is designed to be maintenance free, the following regular inspections would help to ensure the PV Inverter operation at optimal performance level.

(1) Clean any debris that may settle on heat-sink on the back of the unit.
(2) Inspect Grid connection and PV connection. Re-torque terminal screws.
(3) Check the inverter and cables for any signs of external damage. Contact your local service immediately if you find any defects. **Do not carry out any repairs on your own**.

WARNING:

All the installation and wiring connections should be performed only by qualified technical personnel. Disconnect the inverter from PV modules and the Power Grid before maintaining and operating the equipment.

Chapter 7 Technical Data

Model Name	CPS SCA3KTL-O /US	CPS SCA4KTL-O /US	CPS SCA5KTL-O /US
DC Input			
Max. PV Power	4kW	5.2kW	6.5kW
Nominal DC Input Power	3.2kW	4.2kW	5.2kW
Max. DC Input Voltage	550Vdc	550Vdc	550Vdc
Operating DC Input Voltage Range	150-550Vdc		
Start-up DC Input Voltage	200Vdc		
Nominal DC Input Voltage	360Vdc		
Number of MPP Trackers	2	2	2
Number of DC Input Pairs	2x2	2x2	2x2
MPPT Voltage Range	200-470Vdc		
Max. Input Current (Imp)	16A	21A	26A
Max. Input Current per String	13A	13A	13A
Max. Short Circuit Current (Isc)	25.6A (12.8A / MPPT)	33.6A (16.8A / MPPT)	41.6A (20.8A / MPPT)
DC Disconnection Type	Load rated DC switch		
AC Output			
Nominal AC Power @ 208Vac	2.85kW	3.8kW	4.6kW
Nominal AC Power @ 240Vac	3kW	4kW	5kW
Max. AC Power @ 208Vac	2.85kW	3.8kW	4.6kW
Max. AC Power @ 240Vac	3.2kW	4.2kW	5.2kW
Rated Output Voltage	208Vac / 240Vac		
Output Voltage Range @ 208Vac	183-228Vac		
Output Voltage Range @ 240Vac	211-264Vac		
Grid Connection Type	Single phase		

Nominal AC Current @ 208Vac	13.5A	18A	22A
Nominal AC Current @ 240Vac	12.5A	16.7A	20.8A
Max. AC Current @ 208Vac System	13.5A	18A	22A
Max. AC Current @ 240Vac System	13.5A	18A	22A
Rated Output Frequency	60Hz		
Output Frequency Range	59.3-60.5Hz (adjustable)		
Power Factor	>0.99 (±0.95 adjustable)		
Current THD	<3%		
AC Disconnection Type	Load rated AC switch		
System			
Topology	Transformerless		
Max. Efficiency	97.5%		
CEC Efficiency	96.5%		97%
Stand-by / Night Consumption	<8W / <1W		
Environment			
Protection Degree	NEMA 3R		
Cooling	Natural convection		
Operating Temperature Range	-13°F to +140°F / -25°C to +60°C (derating from +113°F / +45°C)		
Operating Humidity	0-95%, non-condensing		
Operating Altitude	6262ft / 2000m without derating		
Display and Communication			
Display	LCD + LED		
Communication	RS485 (Modbus), Ethernet, Zigbee (optional)		
Mechanical Data			
Dimensions (WxHxD)	17x28.7x8.7in / 436x728x220mm		
Weight	84lbs / 38kg		
Safety			
Safety and EMC Standard	UL1741: 2010, CSA C22.2 No.107.1-01, FCC PART15 Class B		
Grid Standard	IEEE1547: 2003, IEEE1547.1: 2005		

Chapter 8 Limited Warranty

The warranty policy of this product is specified in the contract; otherwise, the warranty period is 10 years. For service, Chint Power Systems America will provide local support. For Warranty terms, please refer to the CPS America standard warranty policy in place at time of purchase.

8.1 Disposal

The dealer or installers should remove the PV Inverter from the array and contact the supplier for disposal instructions.

The inverter must not be disposed of with the household waste.

Dispose of the PV Inverter at the end of its service life should be done in accordance with the disposal regulations for electronic waste which apply at the installation site at that time.

8.2 Contact Information

Should you have technical problems concerning this product, please contact our Service line. We require the following information in order to provide you with the necessary assistance:

• Inverter type
• Serial number of the PV Inverter
• Type and number of PV panel connected
• Fault message

Chint Power Systems America Co., Ltd.

Service Hotline: 855-584-7168
Email: AmericaSales@Chint.com

CHINT POWER SYSTEMS AMERICA CO., LTD.

Address: 700 International Parkway, Suite 102

Richardson, Texas 75081

Service Hotline: 855-584-7168

Email: AmericaSales@Chint.com

SHANGHAI CHINT POWER SYSTEMS CO., LTD.

Headquarters: Building 4, No. 3255, Sixian Road,

Songjiang District, Shanghai, China

Tele: +86 -21 -3779 1222 -6300

Fax: +86 -21 -3779 1222 -6001

Website: www.chintpower.com/na/

Part No.: 9.0020.0097A0

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